

Accelerator Systems Division Highlights Ending May 28, 2004

ASD/LANL: Warm Linac

HIGH-POWER RF (WBS 1.4.1.1)

- The fifth and last Thales 5-MW klystron to be site tested is in the socket and under test. So far it looks good.
- The fifth Thales 550-kW klystron to be site acceptance tested is currently under test.
- We are installing the third pair of CCL windows, which have the new style vacuum seal that won't mar the surface.
- Tom Hardek, Don Clark, and Roy Przeklasa are at ORNL this week supporting the HPRF installation.

DIAGNOSTICS (WBS 1.4.5.2)

- The ceramic vendor Macrometalics expects to ship the first set of cards for the RTBT harp by June 9. Meanwhile, we continue work on the HV planes.

ASD/JLAB: Cold Linac

Preparation of the H-1 cryomodule for cooldown is complete. Completion of H-3 cryomodule assembly is expected for next week. Assembly of the H-4 cryomodule is making excellent progress. The cold mass has been inserted into the space frame.

Assembly of the H-5 string is progressing well and will be completed after the Memorial Day break. The first cavity of the H-6 string has been qualified.

Testing of the M-11 cryomodule was terminated. A plan to investigate and repair the failed HOM coupler cable and (possibly) feedthrough has been prepared and will be executed beginning next week.

The 1 MW RF test stand has developed another water leak. Repairs are underway. Pressure regulation is being added to the collector cooling circuit for additional protection.

ASD/BNL: Ring

After discussions with ASD, a decision was made for BNL to extend the ship date of the next RF system by one week, until June 8th. During the week of 6/8, ASD will receive two separate deliveries from BNL; the RF container (with chambers, stands, lifting fixture, etc.) and half-cell #29.

Work continues on half-cells #30 and #31.

Today is the due date for vendor bids on the RTBT 17D224 bend magnet core (BNL's last magnet procurement). Bid evaluation will begin next week.

TiN coating of the Ring primary collimator vacuum chamber was halted when signs of contamination were observed during the coating process. Early detection allowed for fast recovery, investigation and clean-up. It is believed that a rubber o-ring (for a cap flange) was the cause of the problem. A second attempt at coating is being initiated today.

One of the two injection dump septum magnets (both failed high-pot testing) was returned to our vendor (NETC) for repairs. The second magnet will be returned after we complete the injection installation mock-up assembly that is currently underway.

Injection straight section mock-up: a second set of quad doublets has been included in the overall assembly; they are ready to be pinned to their support bases. Vacuum chambers for the dump septum and chicane #4 are in the BNL Shops for minor rework. Chambers for chicane #2 and 3 should be ready for a trial fit next week (with the thin foil chain drive mechanism).

Two extraction kicker PFN power supply modules arrived at SNS/OR from our vendor, APS.

Field quality measurements of chicane #4 were completed this week.

Jon Sandberg, Ken Rust and Ted Hunter traveled to IE Power for acceptance testing of the Ring dipole rectifier. While there, they will also inspect the production run of several medium range and injection kicker power supplies.

A PO was issued for the fabrication of the outer shielding for the two RTBT collimators.

Drawings for the outer shielding for the Ring primary collimator are in Checking.

ASD's Sibley and Thompson will be at BNL next week to discuss LLRF with BNL's Controls group leader, Larry Hoff.

RF: issues related to the dynamic tuning power supply have been identified and repaired.

Diagnostics: a pre-production review of the BPM board is scheduled for next week. Tom Shea will be at BNL for the review.

Controls

The Controls Group participated in the DOE audit of Earned Value procedures this week. Our procedures and understanding were deemed excellent, and there were no findings.

Don Dohan visited this week from the APS. The purpose was to explore possibilities for collaboration in the area of Relational Databases (RDB) for Control System applications. After four days of meetings a brief white paper was prepared which proposes a "Core RDB" for EPICS-based systems and some fundamental tools for its exploitation and population. It was also agreed to replace the SNS Controls RDB framework "JERI" and the APS Controls RDB framework "IRMAS" with the framework developed by the SNS Physics group for XAL applications.

Interviews continued for the position of FPGA Programmer in the Controls group. The field is narrowing.

The servers for both the accelerator and test networks were upgraded this week. Not unexpectedly this led to numerous small problems which had to be dealt with one-by-one, but both systems were running by week's end.

Meetings were held to discuss possible reallocation of laboratory space in the CLO, but the final agreement was to make no changes at all.

Twelve Production MPS chassis arrived and have been tested. A minor problem with LED colors was uncovered but functionally they work fine. These chassis cover requirements through the end of the CCL. The remaining chassis will be delivered in the next two months.

Considerable progress was made this week on the Ion Source Hot Spare Stand. The RF Pulse generator was repaired and tested, including the remote control function from EPICS. The 65Kv supply was installed, tested and accepted by the Ion Source Group. A protection system for the Hot Spare Mass Flow Controller was set up. (Three units at \$1000 a piece have been damaged to date, so this is important.) Finally, a laboratory test of multiple IOCS talking to one PLC was set up and run successfully for almost a week.

The CCL1 magnet power supply control IOC is up and running (EPICS 3.14.5). Preliminary testing identified some issues, but more extensive testing at significant power levels as well as testing of shunt controls will await implementation of the software interlock system in June. The required magnet mapping and cycling data files have been received from the Physics Group.

The Functional System Description (FSD) for Ring magnet power supplies was completely overhauled, including getting PV names corrected, PSC/PSI requirements, red (abnormal)/green (normal) requirements, and flow loss protection for magnets. The FSDs for Beam Dump TCs, Foils and Scrapers, and Collimator Cooling Water System were also upgraded to include latest information on MPS interface requirements.

An SRO package was submitted to the ASD Installation Group for communications cable installation for SCL rack rows 9-12. Rack rows 9-11 are now installed.

All Personal Protection System (PPS) phase 1.1 field work for the Linac is complete. System integration testing is continuing and is 85% complete. Work on EPICS screens is 75% complete. Installation of PPS conduit and cable by AIMSE electricians in the HEBT is 90% complete. Design Reviews of the Linac Oxygen Deficiency Hazard (ODH) system and the Target PPS high-bay remote I/O rack were held, and identified modifications are being made.

Installation

Craft Snapshot 5/25/04

ASD productive craft workers	59.0
Foremen (Pd by 15% OH)	6.0
AMSI management (Pd directly)	3.0
TOTAL AMSI WORKERS	68.0
Less WBS 1.9, 1.2 etc	4.0
Less absent	0.0
TOTAL PD BY ASD/ORNL DB WPs	55.0

Accelerator Physics

DTL1-3 data analysis continues with emphasis on understanding BPM phase scan data. J. Galambos, using the XAL Online Model, is fitting downstream BPM phase scans and BPM phase difference scans to obtain DTL1&2 amplitude, phase and input energy errors. This technique holds the promise of delivering more precise setpoint information, as well as a way to determine input errors. Recently, benchmarks with Ken Crandall's Similac results have been performed.

Lloyd Young visited the SNS AP group to discuss SCL commissioning algorithms. Three algorithms have been identified for cavity amplitude and phase setpoints: i) using the beam induced signal measured by the LLRF system with the cavity unpowered to determine input beam phase and to calibrate the field probe, ii) traditional BPM phase scans for rough phase setpoint, iii) using BPM phase differences to check relative amplitudes of adjacent cavities by back-phasing one with respect to the other. A to-do list for SCL beam commissioning was prepared.

Drawings for the laser-stripping experimental layout was generated by the ME group, and have been sent to BINP to finalize the design of the magnets and vacuum chamber. Expected insertion design completion is end of June.

We have some new results from the effort to more accurately model the radiation levels in the ring injection area. The dose rate to the coil package for chicane magnet #2 is predicted to be about 55,000 rad/h, for the baseline 1.4 MW operation. This high dose rate will limit the useful lifetime of the magnet. We are now exploring local shielding options to reduce the dose rate.

Work has started on the design of the extraction dump vacuum window. This will be a challenging design because the window must be very thin to minimize multiple scattering effects which could lead to an unacceptably large beam size at the beam dump face.

Another ASD/XFD interface meeting was held this week to discuss design details for the temporary target view screen and to discuss limitations on the beam distributions that will be acceptable to the ring injection beam dump.

Operations

Began to develop a detailed schedule for SCL installation and testing with Dan Stout and Ricky Campisi

Interviewed a candidate for Chief Operator:

ASD Operations is now fully staffed with Report-To-Work dates for FY-04

We have 2 hires with RTW dates of October 1, 2004, with 1 accepted waiting for a RTW date

We continue the DataStream equipment structure work with Shane Passmore working on the DTL and David Brown on the CCL

We continue staffing the FEB control room from 08:00-16:00 M-F for Integrates testing/LOTO/Rad Safety Holds

Operations represent the ASD in CLO Move issues

We participated in an RCCS improvement/upgrade meeting

Operations working with Controls on ODH/PPS issues

Ion Source Group

Matthaeus Leitner from LBNL visited SNS and taught us the operation of the Allison emittance scanner system he developed several years ago at LBNL. Two scanners are installed on the hot spare in a diagnostic chamber downstream of a plate that represents the entrance of the RFQ. The initial results were hampered by missing data due to RF noise interfering with the digitizer. The problem was solved with shielding panels and improving configuration. Next week, after solving the e-dump problem, we can start to study the emittance of nominal pulses as a function of different source and LEBT parameters.

Survey and Alignment

A regularly scheduled field calibration of the laser trackers was performed. Later this month, a Leica engineer will be on site to conduct the annual NIST certification of the Laser Trackers. We believe this service to be an absolute necessity in light of the amount of work performed with laser trackers and the less than perfect conditions under which they are operated. Furthermore, one of our trackers has just returned from Germany.

Completed final alignment of DTL 1, 2, and 3.

DTLs 4, 5, and 6 have been set in elevation and further positioning of the tank assemblies is underway.

We have now received the “sorted” position of the medium beta cryomodules. As a result, we are calculating their ideal coordinate location in our global coordinate system. We are aware that this “final location” may still be subject to change.

As with weeks past, we continue on with the target chopper cavity measurements. We are more than half way completed which is a plus. Chopper cavity as-builts need to be completed before the installation of the core vessel inserts which is attentively scheduled for June 18th.

Since we now know positions of the medium beta cryomodules, we are updating our ideal drawing files so when the time comes to perform alignment, we will be ahead of the game.

This week, we again updated our drawing and data base records. Our AutoCAD X-Ref data base now contains nearly 100 drawings that essentially globally tie the site together with well over 20,000 global coordinate positions...

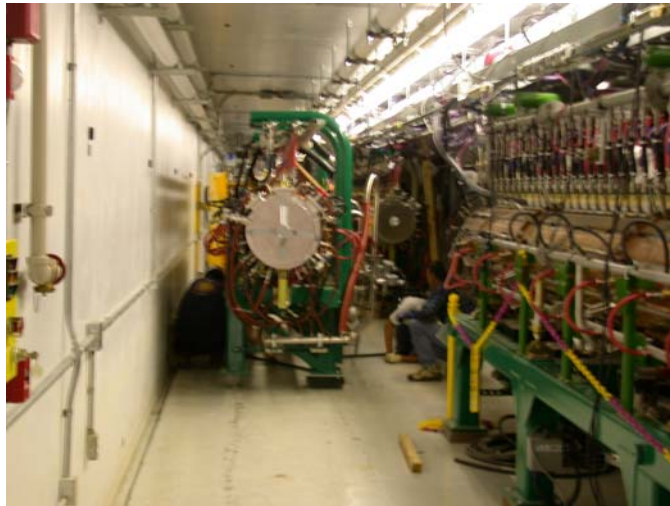
Mechanical Group

All tanks have been checked for alignment and we had to add a few shims under all three new installations but otherwise they are ready to be connected to one another.



DTL4

Tank 5 is installed completing the string of DTL tanks. Prep work on the water header connections was completed and we are filtering the water lines. The move went extremely well.



DTL5

Beamline interface connections are complete and most readouts have been checked.

Beamline interface connections are complete and testing of the cabling has already begun. Water headers from the RCCS are flushed and connected and we will fill the water circuit completely early next week.

Magnet Task

Electrical Group

Installed corrector power supplies in HEBT service Building. Staged corrector power supplies for RSB.

Linac electrical installation in DTL, CCL, and SCL2 and SCL3 areas. Installed rack row 10 (1st row of SCL3), which is needed for SCL2 controls.

Started installation of corrector power supply racks in RSB. Installed 11 power supplies (for a total of 13) in RSB.

Modulator: Prepared CCL4 HVCM for final power testing next week. Prepared SCL1 for tests with LANL participation (Bill Reass will visit).

HPRF

Pipefitting of CCL-3 klystron complete, pressure testing on Tuesday followed by HV and RF. Entire CCL-3 RF system ready for conditioning in a week or two.

First half of SCL ME-2 (6-Klystrons and their transmitter) are in checkout. Six-Thales 550KW klystrons will be staged on the gallery next week. Reference line work proceeding nicely. No problems we cannot handle.

LLRF

Installation: The group is working on SCL ME1 and SCL ME2. The CCL3 system is undergoing final checkout in preparation of CCL3 klystron testing.

Procurements: 120 (of 125) HPMS have been received to date. More than 50% of these have been tested and calibrated. All 125 FCM motherboards have been received. Suntron was given authorization this week to proceed with the balance of the production of the RFO and DFE daughterboards. AFE daughterboards are due in early June.

Cryo-Group

Work continued on the 4.5K cold box actions, including ordering an additional liquid level probe for the dewar, installing air vents, and re-routing the LN2 vent. Modifications to the shield heater also were started. Cryomodule U-tube fabrication (4 sets) is approximately 75% complete. A heater to pot the cold compressors with feedthroughs was completed and is ready for testing. Scaffolding and piping preparations for the LN2 vessel also were completed. The vessel is due next week for installation.

Beam Diagnostics